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The time period for reply, if any, is set in the attached communication.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEPHAN J. JOURDAN, ADI YOAZ, MATTAN EREZ, and RONNY RONEN

Appeal 2009-012023
Application 09/749,405
Technology Center 2100

Before ALLEN R MacDONALD, ROBERT E. NAPPI, and KALYAN K. DESHPANDE, *Administrative Patent Judges*.

DESHPANDE, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF CASE[1]

The Appellants seek review under 35 U.S.C. § 134(a) of a final rejection of claims 1-27[2], the only claims pending in the application on appeal. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

We AFFIRM-IN-PART.

The Appellants invented a method and apparatus for using a meta predictor to predict braches for a branch instruction. Specification 1:7-9

An understanding of the invention can be derived from a reading of exemplary claim 24, which is reproduced below [bracketed matter and some paragraphing added]:

> 24. A method for restoring a branch prediction apparatus following a branch misprediction of a branch instruction, comprising:
> [1] restoring a base misprediction history register; and
> [2] restoring a branch predictor history register.

REFERENCES

The Examiner relies on the following prior art:

Tran	US 5,822,575	Oct. 13, 1998

Po-Yung Chang, Eric Hao, and Yale N. Patt, *Alternative Implementations of Hybrid Branch Predictors*, IEEE Proc. of Micro 28, pp. 252-257 (1995) ("Patt").

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[1] Our decision will make reference to the Appellants' Appeal Brief ("App. Br.," filed Dec. 30, 2005) and Reply Brief ("Reply Br.," filed Sept. 17, 2007), and the Examiner's Answer ("Ans.," mailed July 17, 2007), and Final Rejection ("Final Rej.," mailed May 31, 2005).

[2] The Examiner indicated that claims 9 and 16 recite allowable subject matter but are objected to for depending on a rejected claim.

Scott McFarling, *WRL Technical Note TN-36: Combining Branch Predictors*, Digital Western Research Laboratory, pp. 1-25 (June 1993) ("McFarling").

REJECTIONS

Claims 24-27[3] stand rejected under 35 U.S.C §102(b) as being anticipated by Tran. Ans. 3-4.

Claims 1-8, 10-15, and 17-23 stand rejected under 35 U.S.C §103(a) as being unpatentable over Patt and McFarling. Ans. 4-21.

ISSUES

The issue of whether the Examiner erred in rejecting claims 24-27 under 35 U.S.C. § 102(b) as being anticipated by Tran turns on whether Tran describes a "base misprediction history register."

The issue of whether the Examiner erred in rejecting claims 1-8, 10-15, and 17-23 under 35 U.S.C. § 103(a) as unpatentable over Patt and McFarling turns on whether the combination of Patt and McFarling teaches or suggests "[a] branch prediction apparatus, comprising: … a meta predictor to receive as inputs an index value and a branch prediction to generate a misprediction value in accordance with said inputs."

[3] The Examiner omission of claim 27 in several statements in the record is a typographical error. Ans. 10. The Examiner notes that claim 27 is rejected under the same rejection as claim 24, the claim that claim 27 depends from. Ans. 10.

ANALYSIS

Claims 24-27 rejected under 35 U.S.C §102(b) as being anticipated by Tran

The Appellants contend that Tran fails to describe a "base misprediction history register," as required by claim 24. App. Br. 10-13 and Reply Br. 4-8. The Appellants specifically argue Tran fails to describe a register that is dedicated to recording the history of mispredictions. App. Br. 11. We agree with the Appellants. While the Examiner has shown that Tran describes branch tags become deallocated upon the detection of a mispredicted branch instruction or upon retirement of a branch instruction (Ans. 24-25), the Examiner has failed to provide any evidence or rationale as to how Tran describes a register that records misprediction history information. As such, we find that Tran does not anticipate claims 24-27.

However, the Examiner relied on Patt to describe a "base misprediction history register" in the rejection of claims 1-8, 10-15, and 17-23, as discussed *infra*. Ans. 4-5. Patt teaches a 2-level branch predictor selection algorithm that utilizes a Branch History Register (BHR) that maintains the outcomes of previous branch predictions that is used in combination with a hash function to generate a value that allows a selection scheme to more accurately select the appropriate predictions. Patt 255. We request that the Examiner review whether the combination of these teachings of Tran and Patt render obvious a "base misprediction history register," as recited in claim 24.

Claims 1-8, 10-15, and 17-23 rejected under 35 U.S.C §103(a) as being unpatentable over Patt and McFarling

The Appellants contend that the combination of Patt and McFarling fails to teach or suggest "[a] branch prediction apparatus, comprising: … a meta predictor to receive as inputs an index value and a branch prediction to generate a misprediction value in accordance with said inputs," as required by claim 1. App. Br. 7-10 and Reply Br 2-4. The Appellants specifically argue that (1) Patt specifically fails to describe the *generation* of a misprediction value (App. Br. 7-9 and Reply Br. 2-3) and (2) Patt fails to describe any value that represents a *misprediction* value (App. Br. 9-10 and Reply Br. 3-4) within the meaning of the claimed invention.

The Examiner responded to these arguments at pages 21-23 of the Answer. We agree with and adopt the Examiner's findings of fact and analysis, and reach the same legal conclusions as in that response, the Examiner's rejection, and the Examiner's claim chart at pages 4-5, 12-16, and 21-23 of the Answer.

Patt describes that a hash function is applied to the current and historical value of a branch to generate a value. Patt 255. The generated value is evaluated for accuracy. Patt 255. That is, inaccurate predictions are considered to be mispredictions. Although the Appellants contend that a "misprediction" value is defined as the value used to decide whether to reverse the prediction value (App. Br. 9), we do not find that the construction of the claims is so limited. The Appellants point to the disclosure of "Misprediction Value 112 then may be used to decide whether to reverse the prediction provided by the base predictor, or branch prediction 108" (Specification 6:23) as the definition of a "misprediction." However,

this disclosure only illustrates an example or embodiment of a "misprediction," and does not limit the definition of "misprediction." As such, the Examiner is not precluded from applying the broadest reasonable construction that is consistent with the Specification. The Examiner's construction of a misprediction value encompasses any value that is used to determine or distinguish between accurate and inaccurate (mispredictions). This construction is consistent with the Specification's usage of "mispredcition," where the Specification describes that "[m]ispredictions occur when the branch prediction is incorrect." Specification 1:15-16. As such, we find this construction to be both reasonable and consistent with the Specification and therefore the combination of Patt and McFarling teaches or suggests the *generation* of a *misprediction* value.

CONCLUSIONS OF LAW

The Examiner erred in rejecting claims 24-27 under 35 U.S.C §102(b) as being anticipated by Tran.

The Examiner did not err in rejecting claims 1-8, 10-15, and 17-23 under 35 U.S.C §103(a) as being unpatentable over Patt and McFarling.

DECISION

To summarize, our decision is as follows.

- The rejection of claims 24-27 under 35 U.S.C §102(b) as being anticipated by Tran is not sustained.
- The rejection of claims 1-8, 10-15, and 17-23 under 35 U.S.C §103(a) as being unpatentable over Patt and McFarling is sustained.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2010).

AFFIRMED-IN-PART

msc